

# PATENT ABSTRACTS OF JAPAN

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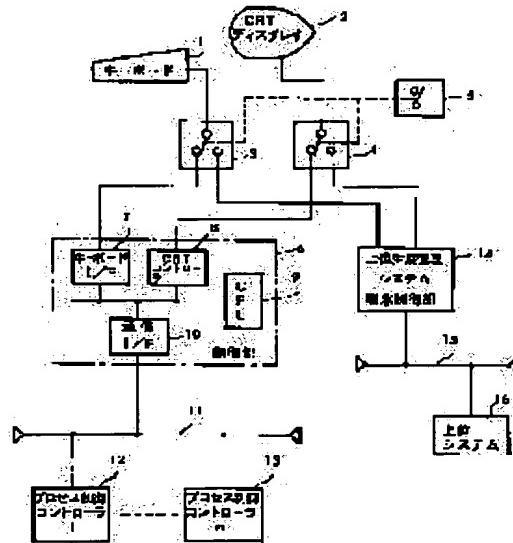
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## (54) PROCESS OPERATOR'S CONSOLE

### (57)Abstract:

**PURPOSE:** To perform the operations of terminals in the systems of different types through a switching system secured between the CRT display signal and the keyboard signal by switching the input/output signals which are fetched by plural different types of control parts with synchronization secured between a CRT display and a keyboard.

**CONSTITUTION:** When a changeover switch 5 is turned on based on its state, a keyboard I/F 7 of a process control system control part 6 is connected to a keyboard 1 for communication via a signal switch 3. In the same away, the CRT signals of a CRT controller 8 are supplied to a CRT display 2 via a CRT signal switch 4. When the switch 5 is turned off, a terminal control part 14 of a host production management system is connected to the keyboard 1 via the switch 3 and also connected to the display 2 via the switch 4.



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**CLAIMS**

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[Claim(s)]

[Claim 1] In the process operator's console of an industrial control system It has a keyboard as the CRT display which is the display means of a couple, and an operator guidance means. It has the control section of two or more different species which can share the aforementioned CRT display and a keyboard. The CRT display signal from two or more control sections among the aforementioned CRT display section The connection signal of CRT signal switch machine in which any 1 switch input is possible, and the aforementioned keyboard is established for a keyboard signal switch machine connectable with any one aforementioned control section. The process operator's console characterized by having switched the aforementioned CRT signal switch machine and the keyboard signal switch machine to any one control section of two or more aforementioned control sections, and enabling connection of them.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Field of the Invention] In the process operator's console which is the control unit of the process control system which performs control of various plants, and monitoring, although this invention does not treat the process control, the system, for example, the high order production control system etc., of different species etc., itself for a CRT display signal and a keyboard signal by the operator guidance of usual process control, and switch operation other than monitoring, it relates to the process operator's console which made operational operation of an information, off-site facilities, etc. relevant to process control on the operator's console of the aforementioned process control system.

[0002]

[Description of the Prior Art] When [ this ] the measuring instrument screen which imagined the industrial instrument, the graphic screen expressing the schematic diagram of a plant, the trend screen expressing the progress status of a control state, etc. are displayed on CRT and keyboard grabbing performs control operation and monitoring, the process operator's console of a process control system outputs an alarm with alarm sound etc. at the time of unusual-on process part occurrence at the same time it carries out the blink display of the unusual content on CRT to a process operating staff automatically. On the other hand, it connects with the process control controller distributed by the communication network of exclusive use, and the control section of the aforementioned process operator's console displays the operating state and the content of a control of a plant with the various aforementioned CRT screens through a process control controller, and performs change of the content of a display, and control operation by keyboard grabbing. The process operator's console which performs operation of these series can distribute the suitable number like a process control controller by the scale, the amount of control information, the number of CRT display screens, the number of an operating staff, etc.

[0003]

[Problem(s) to be Solved by the Invention] Like the above, a process operator's console is set by the scale of process control, the amount of control information, operation manpower, etc., and are the required number and a thing which is distributed and carries out control of a process, monitoring, etc. by the CRT display and keyboard grabbing according to the purpose. In recent years, process control is complicated by the multi-form production process which produces the product of two or more modalities in the quality of the product by process control, the enhancement in a productivity, and one plant, the content of a control and amount of information are increasing, it is in screen modalities, such as a measuring instrument screen in a process operator's console which carries out a CRT display, a graphic screen, a trend screen, and an alarm display, and the inclination that the number of screens increases, and the installation number of a process operator's console also increases inevitably. On the other hand, the so-called CIM-ization which carries out the batch management of the whole works or the company whole [ other than process control ] from an order-received information to a production and shipment is advanced on the plant operation management, organic combination of the

conventional process control system, a high order production control system, etc. is needed, an information required for a plant control is inputted from a high order production control system by communication connection, and it has realized with outputting the production result and the production status to a high order production control system from a process control system. Only by however, the function obtained by the aforementioned communication connection with the process operator's console which performs process control Display of the information on all high order production control systems and operation cannot be performed. The content is limited to the content of the software of a process control system. In the plant operation management office, therefore, besides a process operator's console The terminal unit of a high order production control system will be installed, operation will be carried out respectively if needed, and there are problems, like the workability of the operating staff by the problem of the installation space by increase of the number of a console and two or more sets operation is bad. this invention realizes operation as a terminal of the system of different species, such as a high order operation managerial system, other than the operation of process control with the switch method of a CRT display signal and a keyboard signal on the console of the process operator's console for process control.

[0004]

[Means for Solving the Problem] this invention is realizable by switching the I/O signal which CRT signal switch machine which can any 1 selection connect each CRT display signal and keyboard signal of the control section of a process operator's console and the control section of terminals, such as a high order production control system, and a keyboard signal switch machine are formed, and the aforementioned CRT display and a keyboard synchronize, and scrambles for the CRT display and keyboard of a pro \*\*\*\*\* \*\* rhe \*\*\*\*\* console with the control section of two or more aforementioned different species as a control section of two or more different species.

[0005]

[Function] namely, as a status signal of the CRT display of a process operator's console Although the analog RGB code which expresses the three primary colors of a color with three analog signals is common and that the number of pixel dots which can be expressed and display frequency of a CRT display are the same is the conditions required of CRT controller of two or more control sections of different species further A process operator's console in recent years The highly minute CRT display is used from increase of the amount of information which can express the CRT. An engineering workstation and X terminal equipment are used as a terminal unit of a high order production control system. With CRT signal switch vessel which used the multiplexer for video signals in which the same highly minute CRT display is used, and these CRT displays also have the display frequency band of a CRT display signal The selection output of the CRT display signal from two or more CRT controllers will be carried out at a CRT display. On the other hand, the connection signal of a keyboard is what recognizes the content of operation with outputting the key number to which the key stroke of the keyboard was carried out by clock synchronization formula half duplex serial communication, and the key ON/OFF status to a control section at the time of a key stroke. While it is displayed on a CRT display through the control section to which the result of a key stroke was connected by connecting with the same control section as the control section to which the aforementioned CRT display was connected by the keyboard signal switch machine, the operation according to the purpose is realized.

[0006]

[Example] Hereafter, the process operator's console by this invention is explained from drawing 1 using drawing 5. The block diagram of this example is first shown in drawing 1. this example forms the keyboard signal switch machine 3 and CRT signal switch machine 4 between the control sections for process control systems 6 and the terminal-control sections 14 of a high order production control system which share a keyboard 1 and CRT display 2 like the above and which are a control section of different species. Based on the status of a transfer switch 5, connect with a keyboard 1 through the keyboard signal switch machine 3 in the time of ON, and communication connection of the transfer switch 5 is made for the keyboards I/F7 of the control section for process control systems 6 with keyboards I/F7. CRT signal of the CRT controller 8 is

similarly connected to CRT display 2 by CRT signal switch machine 4. As a result, a keyboard 1 and CRT display 2 both sides are connected to the control section for process control systems 6, and an operating staff transmits control information with the process control controller n13 from process control controller (1) 12 by which CPU9 was distributed by a CRT display and keyboard grabbing through the communications I/F10 and the process-control-system communication network 11, and carries out plant operation. On the other hand, a transfer switch 5 at the time of OFF the terminal-control section 14 of a high order production control system Connect with a keyboard 1 through the keyboard signal switch machine 3, and connect with CRT display 2 through CRT signal switch machine 4 similarly. As a result, a keyboard 1 and CRT display 2 both sides are connected with the terminal-control section 14 of a high order production control system. an operating staff Operation with host system 16 can be performed through the high order communication network 15 connected to the terminal-control section 14 of a high order production control system by the CRT display and keyboard grabbing. Thus, an operating staff can realize operation of a process control system, and operation of a high order production control system only by operation of a transfer switch 5 using the same keyboard and the same CRT display if needed.

[0007] Next, drawing 2 and the drawing 3 explain the interior action of CRT signal switch machine 4 of aforementioned view 1 in this example. In order CRT signal switch machine switches the analog RGB code from the control section of different species using ON/OFF information on a transfer switch like the above, and to connect with a CRT display, to switch two or more systems to one CRT display and to operate them, it is the greatest point how this with the large displeasure to which the switch operation may also be frequently performed and a synchronous gap of the CRT display at the time of a switch gives it to an operating staff is stopped to the minimum extent. CRT signal switch machine of this invention is switching synchronizing with VSYNC (vertical-retrace-line signal) of a CRT display paying attention to the synchronizing signal made to superimpose on G signal of the analog RGB code which is a CRT display signal. In drawing 2 , the multiplexers for video signals 17, 18, and 19 three analog signals of SYNC status (0V) created two analog RGB codes and inside NO1CRTIN and NO2CRTIN according to the status of R-S flip-flops 23 and 24 Output any one signal to CRTOUT and input-impedance matching of all the input signals of NO1CRTIN and NO2CRTIN is carried out in resistance R. Moreover, while the multiplexers for video signals 17, 18, and 19 use what equipped output amplifier and adjust an output impedance by resistance R Twice as many gain as this is compensated by the return signal pressured partially by two resistance R', it is pressured partially by the input impedance and the aforementioned resistance R of a CRT display, and an input signal and the signal of the same level are transmitted to a CRT display. By detecting SYNC level which is the synchronizing signal of a CRT display, and supervising SYNC time further from the analog G signal inputted to asynchronous timing, respectively, the VSYNC detectors 20 and 21 classify HSYNC (horizontal-retrace-line signal) and VSYNC, and extract only VSYNC timing. A filter circuit 22 removes the chattering of the input signal of a transfer switch, and changes it into logical level. Thus, R-S flip-flops 23 and 24 are operated during VSYNC time by the status and the aforementioned VSYNC detectors 20 and 21 of a transfer switch, and a switch operation of CRT signal is performed. In CRT signal switch timing chart of drawing 3 , although the display frequency of the NO1CRTG signal and the NO2CRTG signal is the same, it is operating asynchronously, and the output of the VSYNC detectors 20 and 21 is also detected, after the phase has shifted. At the time of ON, for a MPX switch signal 23-Q signal, it is LOW and a transfer switch is [ HIGH and 24-Q signal ] NO1CRTG in a CRT output G signal. A signal is outputted. Next, if a transfer switch switches and operates at OFF, in VSYNC of NO1CRT, will be at the detection time, 23-Q will serve as LOW, and a CRT output G signal will output the 3rd SYNC signal. Next, NO2CRTG which should be switched 24-Q serves as HIGH at the time of VSYNC detection of a signal, and it is NO2CRTG to a CRT output G signal. By the translation that a signal is outputted Have compensated the synchronous gap with the type where VSYNC level is buried for a gap of a NO1CRTG signal and a NO2CRTG signal. Other R signals and B signal are also switched synchronizing with this G signal. In drawing 3 , a transfer switch Although the time of OFF switch was explained from ON, when a transfer switch is

switched to ON from OFF, it is NO2CRTG similarly. It is NO1CRTG when it changed into SYNC status when VSYNC of a signal was detected, and VSYNC of a NO1CRTG signal was detected. It switches to a signal.

[0008] Next, drawing 4 and the drawing 5 explain the interior action of the keyboard signal switch machine 3 of aforementioned view 1 in this example. The keyboard in this example + It is what is connected with the keyboards I/F of a control section by CLOCK signal which creates the timing which incorporates DC current supply of 5V, DATA line of a half-duplex serial communication mode, and DATA. Are, drive CLOCK line and DATA line at the time of a key stroke, and a key number and key ON/OFF are outputted to keyboards I/F from a keyboard. Conversely, output commands, such as lighting / putting out lights of Caps Lock Light Emitting Diode, and a click buzzer singing, to a keyboard from keyboards I/F. Therefore, are the aforementioned DATA line and CLOCK line both-directions transmission line, and are using the FET analog switches 25 and 26 as a switch circuit. Moreover, as for +5VDC current supply to a keyboard, each current supply of NO1 keyboards I/F and NO2 keyboards I/F is connected with the keyboard after OR connection from schottky diodes D1 and D2. Both sides detect that remove a chattering by the filter circuit 28, and DATA line and CLOCK line of keyboard connection are HIGH, and it is carrying out a fixed time continuation of the ON/OFF status of a transfer switch with the retriggerable one shot 27 and an RC circuit time constant, control R-S flip-flop 29, and perform a switch logic. In drawing 5, the command output from the keyboards I/F of the time of a key stroke and its result carries out the both-directions operation of CLOCK signal and the DATA signal. A transfer switch is [ 29-Q ] HIGH at the time of ON, NO1 keyboards I/F are connected with the keyboard, the FET analog switch 25 is in ON status, and key DATA of a key stroke is connected with NO1 keyboards I/F, and the command output of NO1 keyboards I/F is similarly connected to the keyboard. Next, when a transfer switch is turned off [ it ] and DATA line and CLOCK line are operating state at this time Do not immediately switch, but when both sides are HIGH and a fixed time continuation was carried out, a 27-Q output serves as HIGH, 29-Q serves as LOW, and subsequent DATA line and subsequent CLOCK line of a keyboard mind the FET analog switch 26. It means that it connected with NO2 keyboards I/F. Furthermore, since it is switched when both sides do HIGHing and a fixed time continuation also of the operation when a transfer switch is switched to ON from OFF according to the status of DATA line and CLOCK line similarly A keyboard and NO1 keyboards I/F, and each NO2 keyboard I / F are in the middle of a communication, and does not switch, and failure, such as a communication error, arises.

[0009]

[Effect of the Invention] Furthermore according to this invention it connects with CRT signal switch machine and a keyboard signal switch vessel, it switches each CRT display signal and keyboard connection signal of the control section of a process control system, and the terminal-control section of a high order production control system only by operation of a transfer switch and it can operate the CRT display and keyboard of a process operator's console of the system for process control, a CRT display is switched and a keyboard switch is [ that there are few synchronous gaps at the time ] also satisfactory. It is effect size that two or more CRT displays and keyboards whose introduction of CIM-izing is attained are had and twisted, and it can realize cheaply etc., without extending the enhancement in the workability of an operating staff, and the arrangement space of a process operator room by these by being the process operator interior of a room, and having realized with the same CRT display and same keyboard as operation of a process control system, and the terminal handling of a high order production control system.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

- [Drawing 1]** It is a process operator's-console block diagram.  
**[Drawing 2]** It is CRT signal switch machine block diagram.  
**[Drawing 3]** It is CRT signal switch timing chart.  
**[Drawing 4]** It is a keyboard signal switch machine block diagram.  
**[Drawing 5]** It is a keyboard signal switch timing chart.

**[Description of Notations]**

1 [ -- Keyboard signal switch machine, ] -- A keyboard, 2 -- A CRT display, 3 4 [ -- The control section for process control systems, ] -- CRT signal switch machine, 5 -- A transfer switch, 6 7 [ -- CPU, 10 / -- Communications I/F, ] -- Keyboards I/F8 -- CRT controller, 9 11 [ -- Process control controller n, ] -- A process-control-system communication network, 12 -- Process control controllers 1 and 13 14 -- The terminal-control section of a high order production control system, 15 -- High order communication network, 16 [ -- VSYNC detector, 22, 28 / -- A filter circuit, 23 24, 29 / -- An R-S flip-flop, 25 26 / -- FET analog switch, 27 / -- Retriggerable one shot. ] -- Host system, 17, 18, 19 -- The multiplexer for video signals, 20, 21

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[Translation done.]

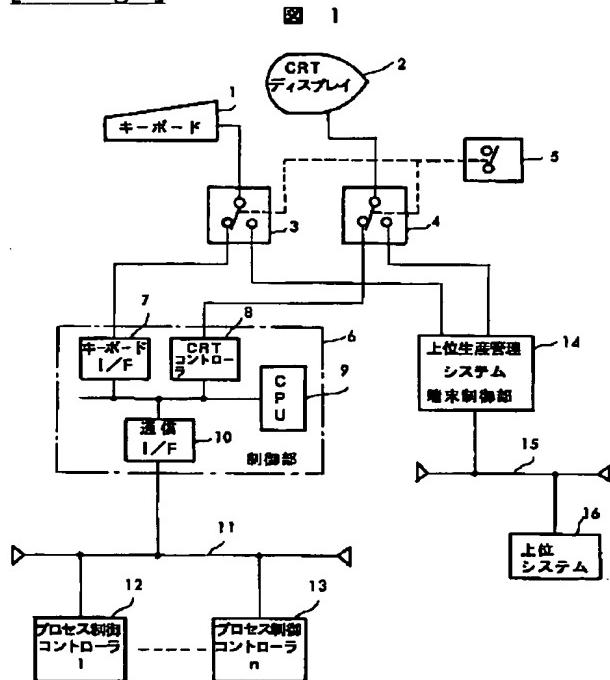
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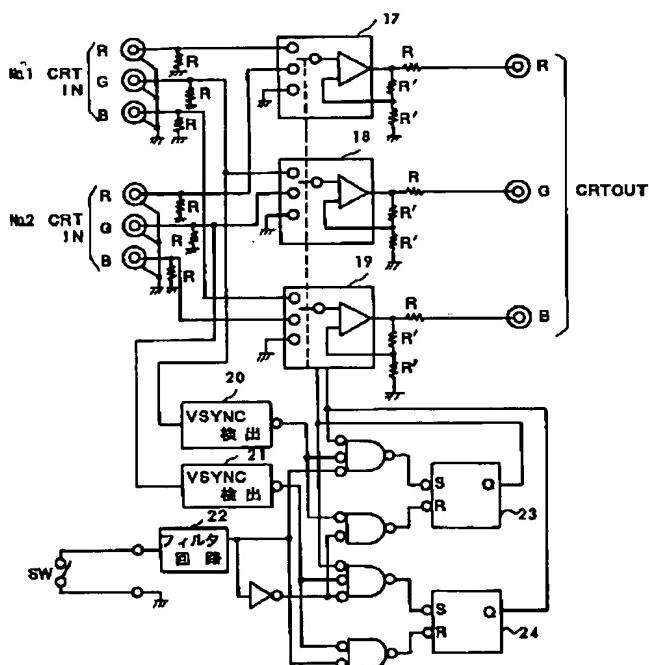
## DRAWINGS

[Drawing 1]



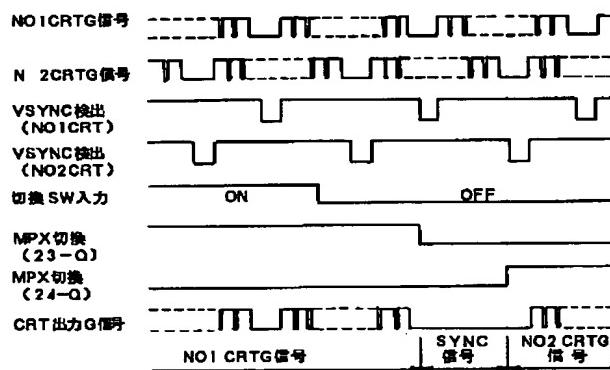
[Drawing 2]

図 2



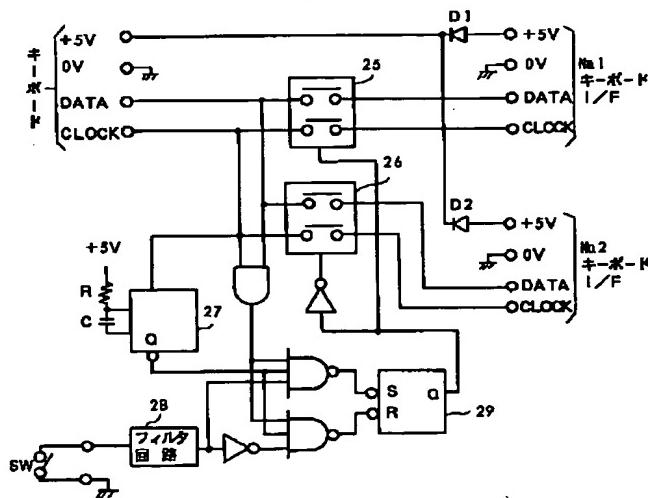
[Drawing 3]

図 3



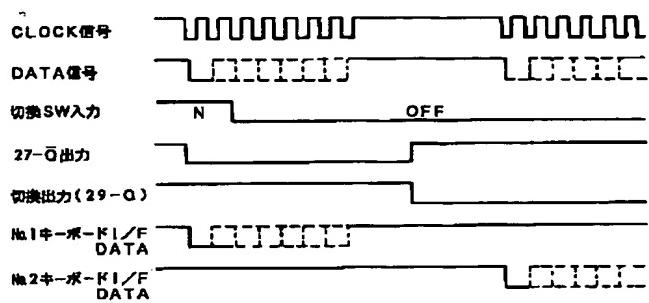
[Drawing 4]

図 4



## [Drawing 5]

図 5



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